What is claimed is:

1. A broadband linearized RF amplifier comprising:

a power amplifier for receiving and amplifying a relatively undistorted RF input signal provided by a modulated carrier wave, wherein the RF output signal from said power amplifier contains distortion products generated in amplifying the input signal;

a source of reference carrier wave;

Alpha Loop means for processing the input and output signals to produce a first reference signal having processed distortion products at a dB level lower than that of the carrier;

Gamma Loop means for processing the reference carrier wave and distorted output signal from said power amplifier, to remove the carrier wave from the output signal and produce a second reference signal containing only distortion products occurring in the RF output signal; and

Beta Loop means for comparing said first and second reference signals to produce properly weighted, phase adjusted, and amplified distortion products, for summing with the distorted output signal from said power amplifier, to cancel the distortion products from the output signal.

2. The amplifier of Claim 1, wherein said Beta Loop means cancels distortion products ranging from about -5 dB to about -110 dB relative to the reference carrier wave.

3. The amplifier of Claim 1, wherein said Alpha Loop means includes:

a first Vector Modulator for receiving and phase inverting said RF input signal in response to signals received at in-phase "I" and quadrature "Q" input terminals thereof, and providing an output signal that is 180° out of phase with said RF input signal;

a first summer for producing an output signal that is the sum of the output signal from said power amplifier and the output signal from said first Vector Modulator;

a first multiplier for multiplying the output signal from said first vector multiplier with the unmodulated carrier wave to produce a first product signal;

first low pass filter means for filtering said first product to produce a first filtered signal;

a second multiplier for multiplying the output signal from said first summer with the unmodulated carrier wave to produce a second product signal;

second low pass filter means for filtering said second product signal to produce a second filtered signal; and

first correlator means for correlating said first and second filtered signals to produce in-phase "I" and quadrature "Q" output signals for driving and connection to the "I" and "Q" input terminals, respectively, of said first Vector Modulator.

4. The amplifier of Claim 3, wherein said first low pass filter means includes:

a first band pass filter having an input connected to an output of said first multiplier;

a first analog-to-digital (A/D) converter having an input connected to an output of said first low pass filter; and

a first demodulator/finite impulse response low pass filter having an input connected to an output of said first A/D converter, and an output connected to both a first input of said first correlator means, and a first input of said Gamma Loop means.

5. The amplifier of Claim 4, wherein said second low pass filter means includes:

a second band pass filter having an input connected to an output of said second multiplier;

a second A/D converter having an input connected to an output of said second low pass filter; and

a second demodulator/finite impulse response low pass filter having an input connected to an output of said second A/D converter, and an output connected to both a second input of said first correlator means, and a first input of said Beta Loop means.

6. The amplifier of Claim 5, wherein said Gamma Loop means includes:

a second Vector Modulator for receiving and phase inverting said RF input signal in response to signals received at "I" and "Q" input terminals thereof, to provide an output signal representative of the phase inverted RF input signal;

a second summer for producing an output signal that is the sum of the output from said second Vector Modulator and an RF output signal from said linearized amplifier;

a third multiplier for multiplying said unmodulated carrier wave with the RF output signal from said linearized amplifier to produce a third product signal;

a third low pass filter means for filtering said third product signal to produce a third filtered signal; and

second correlator means for receiving and correlating said first and third filtered signals to produce "I" and "Q" output signals for driving and connection to the "I" and "Q" input terminals, respectively, of said second Vector Modulator, for nulling to zero the carrier wave in said third filtered signal.

7. The amplifier of Claim 6, wherein said Beta Loop means includes:

a third Vector Modulator for receiving and phase inverting the output signal from said first summer in response to signals received at "I" and "Q" input terminals, thereof, for producing an output signal representative of the distortion products occurring in the RF output signal from said linearized amplifier that are 180° out of phase with the latter;

a third correlator for receiving and correlating said first and third filtered signals to produce "I" and "Q" output signals for driving and connection to the "I" and "Q" input terminals, respectively, of said third Vector Modulator;

a error amplifier for receiving the output signal from said third Vector Modulator, for amplifying the same to produce an output signal containing distortion products of substantially the same amplitude but 180° out of phase with the distortion products in the RF output signal from said linearized amplifier; and

a third summer for receiving and summing the output signal from said power amplifier with the output signal from said error amplifier, for producing an RF output signal from said linearized amplifier that is substantially free of distortion products.

8. The amplifier of Claim 7, wherein the wattage of said error amplifier is small relative to the wattage of said power amplifier.

9. The amplifier of Claim 7, wherein said Alpha, Beta, and Gamma correlators are each provided by field programmable gate arrays.

10. The amplifier of Claim 1, wherein said linearized RF amplifier is operable at full power of said power amplifier over a frequency range from about 20 MHz (megahertz) to about 2 GHz (gigahertz).

11. A method for providing a broadband linearized RF amplifier system comprising the steps of:

amplifying via a power amplifier an undistorted RF input signal, whereby the amplified RF output signal includes a modulated carrier with distortion products produced during amplification;

removing the modulated carrier from the RF output signal to obtain a comparison signal containing only the distortion products;

phase inverting by 180° the distortion products in the comparison signal;

dynamically adjusting the phase inverted distortion products to have the same amplitude as the distortion products in the amplified RF output signal; and

summing the phase and amplitude adjusted distortion products with the amplified RF output signal to produce an RF

output signal from said RF amplifier system that is substantially free of distortion products.

12. A method for providing a broadband linearized RF amplifier system comprising a power amplifier that amplifies an RF input signal and produces a first output signal containing distortion products added to the RF input signal during the amplification process, the method comprising the steps of:

processing the RF input signal and said first output signal from said power amplifier to produce a first processed signal containing only said distortion products;

summing together the first output signal from said power amplifier with an output signal from an error amplifier to provide an RF second output signal from said RF amplifier system;

processing the RF input signal, said second output signal, and a reference carrier wave, to remove the carrier wave from said second output signal and to produce a second processed signal containing only said distortion products; and

processing said first and second processed signals for producing a third processed signal containing phase adjusted distortion products for amplification by said error amplifier to cause said distortion products to be canceled from said second output signal.